

1 CLAIMS:

2 1. A wet-friction, composite material suitable for use in
3 applications selected from the class consisting of wet
4 transmission couplings, automatic lockers, limited slip
5 differentials, smart clutches, synchronizers, brakes and the
6 like, comprising: a carbon or graphite fabric formed from a
7 woven, continuous, untwisted filament yarn and impregnated with
8 modified cyanate ester resin or oligomers which are subsequently
9 cured.

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11 2. The composite material of Claim 1, in which the modified,
12 cured cyanate ester resin weight in the fabric is at least about
13 10% by weight of the cured resin based on the combined weight of
14 fabric and cured resin.

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16 3. The composite material of Claim 1, in which the modified
17 cyanate ester resin in the fabric is about 10% - 50% by weight of
18 the cured resin based on the combined weight of fabric and cured
19 resin.

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21 4. The composite material of Claim 1, in which the modified
22 cyanate ester resin in the fabric is about 10% - 35% by weight of
23 the cured resin based on the combined weight of fabric and cured
24 resin.

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1 5. The composite material of Claim 1, in which the modified
2 cyanate ester resin weight in the fabric is about 10% - 25% by
3 weight of the cured resin based on the combined weight of fabric
4 and cured resin.

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6 6. The composite material of Claim 1, in which the modified
7 cyanate ester resin in the fabric is about 10% - 18% by weight of
8 the cured resin based on the combined weight of fabric and cured
9 resin.

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11 7. The composite material of Claim 1, in which the modified
12 cyanate ester resin in the fabric is about 12% - 17% by weight of
13 the cured resin based on the combined weight of fabric and cured
14 resin.

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16 8. The composite material of Claim 1, in which the modified
17 cyanate ester resin in the fabric is about 40% - 50% by weight of
18 the cured resin based on the combined weight of fabric and cured
19 resin.

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21 9. The composite material of Claim 1, provided as a supplied
22 product including an adhesive coating for applying to a metal
23 surface, an adhesive film for application to a metal surface, or
24 a cured fabric without an adhesive coating.

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1 10. The composite material of Claim 1, in which the fabric is
2 formed as a continuous spiral, cut to size and bonded to the
3 transmission in one piece.

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6 11. The composite material of Claim 1, in which the fabric
7 material is selected from the class consisting of carbon,
8 graphite, ceramics, boron, aramid fiber, glass, quartz, silica,
9 and mixtures thereof.

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11 12. The composite material of Claim 1, in which the fabric weave
12 is a plain weave.

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14 13. The composite material of Claim 1, in which the fabric weave
15 includes: braided, 5 and 8 harness satin, basket, twill and,
16 crowfoot satin.

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1 14. The composite material of Claim 1, formed from a prepeg in
2 which the modified cyanate ester resin or oligomer is selected
3 from the class consisting of: polycyanate ester modified with
4 silicone elastomer, polycyanate ester modified with epoxy resin,
5 polycyanate ester modified with polyetherimide, polycyanate ester
6 modified with polyphenoxy resin, polycyanate ester modified with
7 polysulfone or polyether sulfone resins, polycyanate ester
8 modified with polyimide resins, polycyanate ester modified with
9 polycarbonate resins, polycyanate ester modified with diglycidyl
10 ether of novolac resins, and polycyanate ester modified with
11 cresol novolac resins.

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13 15. A wet friction material for transmission couplings
14 comprising a modified cyanate ester cured fabric formed from a
15 braided fabric from continuous, untwisted filament yarn.

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17 16. The transmission coupling of Claim 15, in which the modified
18 cyanate ester resin content in the fabric as cured is about
19 10% - 18% by weight of the cured resin based on the combined
20 weight of fabric and cured resin.

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22 17. The transmission coupling of Claim 12, in which the modified
23 cyanate ester resin content in the fabric as cured is about
24 12% - 17% by weight of the cured resin based on the combined
25 weight of fabric and cured resin.

1 18. The composite material of Claim 1, comprising a yarn end
2 count of 1,000 - 24,000 continuous filaments.

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4 19. The composite material of Claim 1, comprising a yarn end
5 count of about 3,000 - 12000 continuous filaments.

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7 20. The composite material of Claim 1, comprising a cured
8 material thickness of about 0.015 - 0.080 inches.

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10 21. The composite material of Claim 1, comprising a cured
11 material thickness of about 0.024 - 0.028 inches.

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13 22. The composite material of Claim 1, comprising a cured
14 material thickness of about 0.015 - 0.080 inches and an end count
15 of about 3,000 - 12,000 continuous filaments.

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17 23. The composite material of Claim 1, comprising a cured
18 material thickness of about 0.024 - 0.028 inches, and an end
19 count of about 6,000 - 12,000 continuous filaments.

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21 24. The composite material of Claim 1, in which the modified,
22 cyanate ester resin or oligomer is cured.

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1 25. The composite material of Claim 1, comprising at least two
2 layers of material adhesively bonded together.

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4 26. A method of forming a composite suitable for use as a wet
5 friction coupling in applications selected from the class
6 consisting of transmission couplings, automatic lockers, limited
7 slip differentials, smart clutches, synchronizers, brakes and the
8 like, comprising impregnating a plain woven fabric with a
9 modified cyanate ester oligomer, the fabric being formed from a
10 continuous, untwisted carbon filament yarn having an end count of
11 about 3,000 - 12,000, the modified cyanate ester resin or
12 oligomer as cured in the fabric being about 10% - 50% based on
13 the weight of the fabric and cured resin, and the composite
14 thickness being about 0.015 - 0.080 inches.